WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

Role of WMO in support of environmental conventions

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WMO, Research Department

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World Meteorological Organization
Organisation météorologique mondiale

WMO Mandate

WMO provides world leadership and expertise in international cooperation in the **delivery and use of high-quality, authoritative weather, climate, hydrological and related environmental services** by its Members, for the improvement of the well-being of societies of all nations.

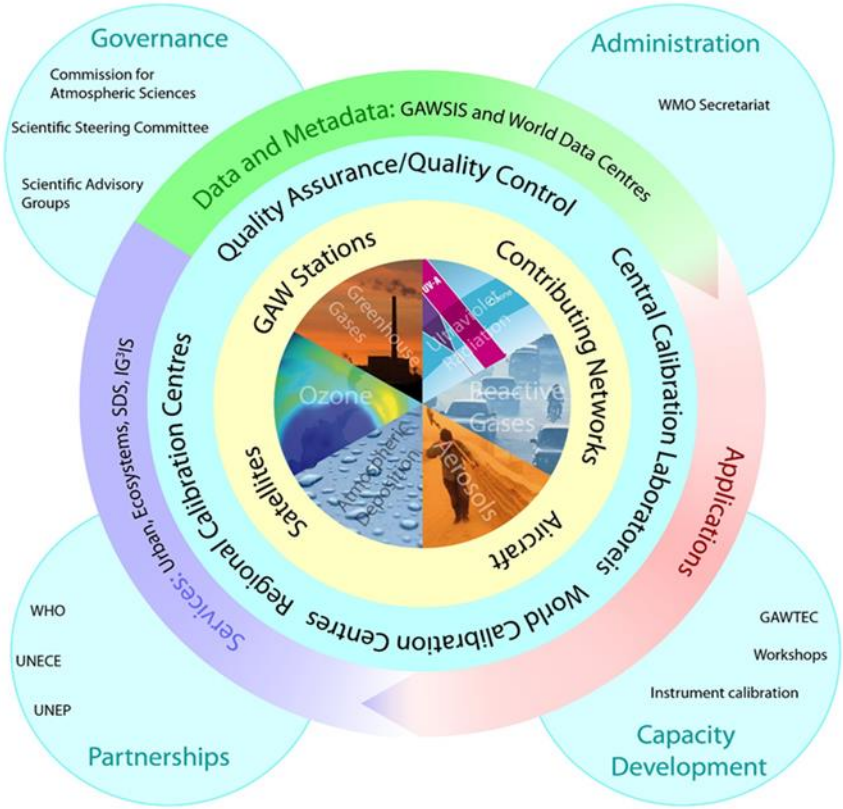
Principal Policy Drivers

- **Sustainable Development Goals (SDGs)** (No. 1, 2, 3, 5, 6, 7, 9, 11, 13, 14, 15 and 17)
- **Paris Agreement**
- **Sendai Framework** for Disaster Risk Reduction
- **Several environmental conventions**

Global Atmosphere Watch Programme

Provides international leadership in research and capacity development in atmospheric composition observations and analysis through:

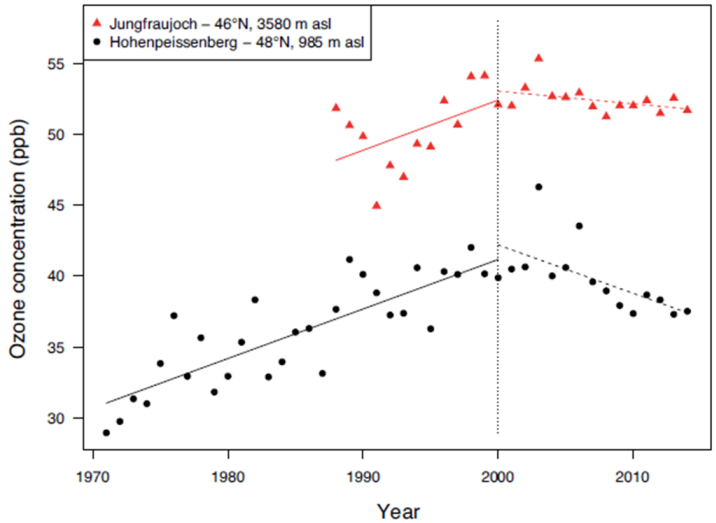
- *maintaining and applying long-term systematic observations of the chemical composition and related physical characteristics of the atmosphere,*
- *emphasizing quality assurance and quality control,*
- *delivering integrated products and services related to atmospheric composition of relevance to users.*

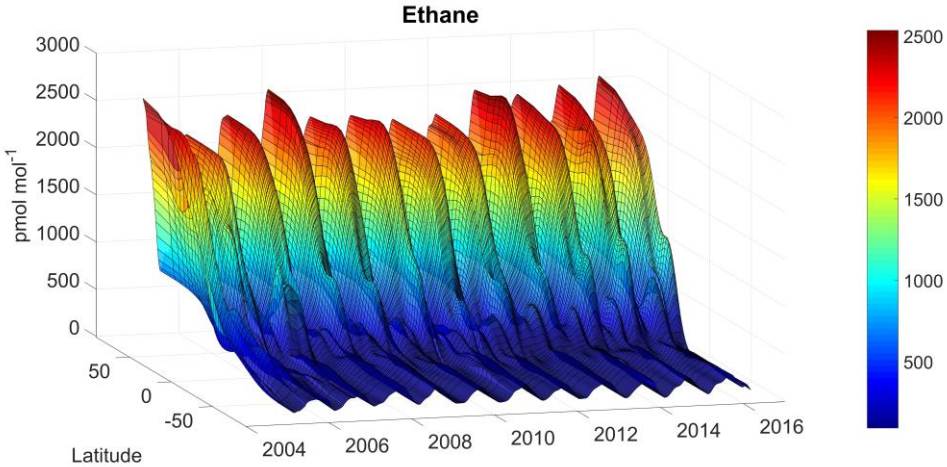


GAW provides evidences for the policy making (including international conventions) and effects community and services (forecasting) for prevention of the impacts

Convention on Long-Range Transboundary Air Pollution (LRTAP), Geneva, 1979

- WMO co-chairs the LRTAP Task Force on measurements and modelling
- EMEP constitutes the European contribution to the GAW Programme
- The measurements guidance on reactive gases, aerosols and precipitation chemistry are largely shared between EMEP and GAW
- LRTAP and GAW closely collaborate on the development of the modelling tools
- The ultimate goal of convention is to initiate the actions on emission reduction that lead to improved air quality and reduced impacts on ecosystems, forests and health





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SDG 3: Ensure healthy lives and promote well-being for all at all ages

Joint WHO and WMO Health, Environment, and Climate Action Plan

MoU between WMO and WHO was signed in May 2018

Agreed to develop **5year Joint Workplan on Climate, Health, Environment**, and inform proposals for Integrated Health Services to WMO Congress-18

Objective: Enhance capacity building, technical support, and coordination for WHO and health partners to co-develop, access and use climate, weather, and environmental information.

Health Needs for Data Services, Research, Operational Services span four thematic areas:

- **Climate and Climate Services**
- **Air Pollution**
- **Extreme Weather**
- **Water**

Two geographic focus areas of common interest:

i) **small island developing states**
ii) **urban areas**

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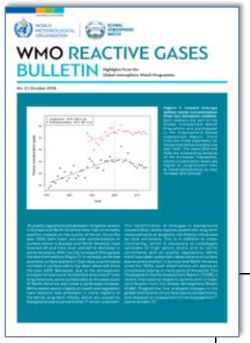
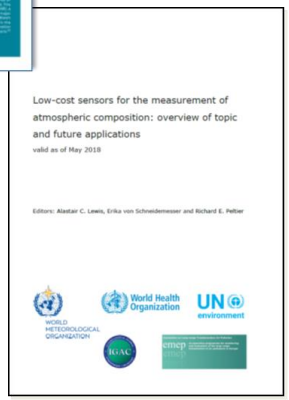
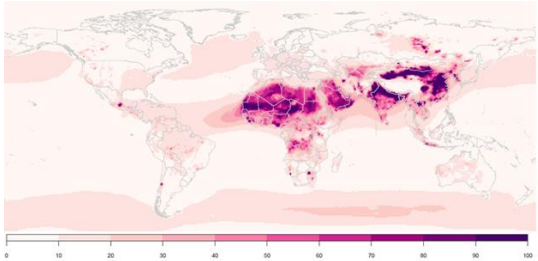
WMO commitments at the First WHO Global Conference on Air Pollution and Health

- providing scientific basis for policy-making and evidence-based monitoring of pollution via enhancing observations and communication, assessments and reports;
- providing tools to reduce risk via **forecasts**, warning and advisory services (including integrated urban and health services);
- enhance the capacity of the countries to support health sector in close collaboration with WHO

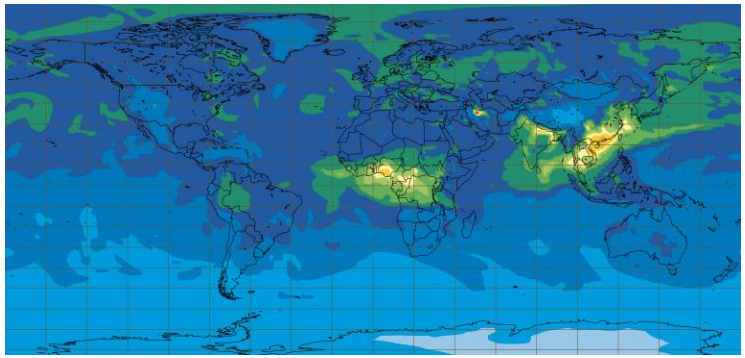






Global reanalysis: global distribution of PM2.5 in CAMS reanalysis (for 2016) – contributes to the Global Platform

Example of CAMS forecast of carbon monoxide



CAMS is recognized as a provider of the air quality forecasts for WMO

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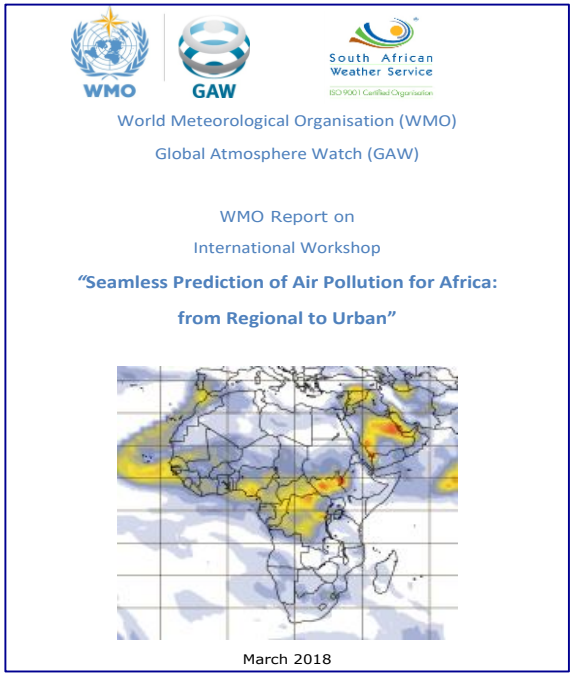
Vincent-Henri Peuch co-chairs GAW Scientific Advisory Group on Applications

Towards Integrated Air Quality Forecast Systems in Africa


WMO GAW South African Weather Service

World Meteorological Organisation (WMO)

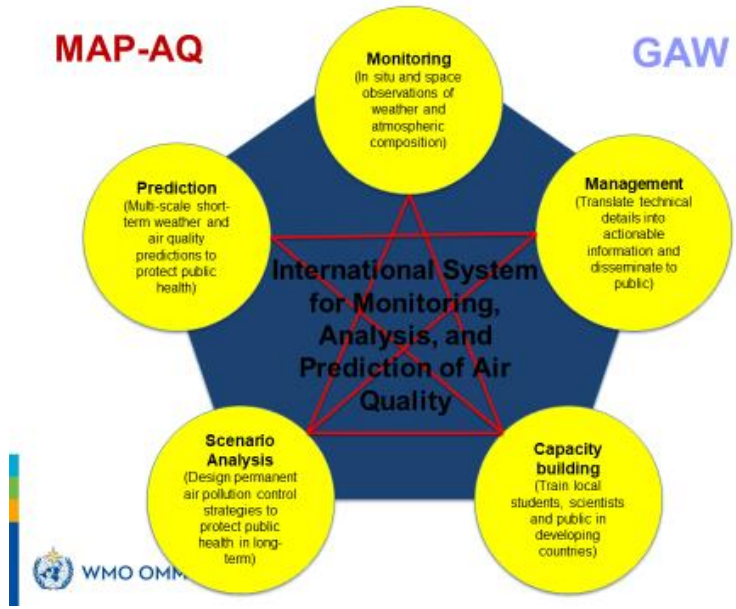
Global Atmosphere Watch (GAW)

WMO Report on

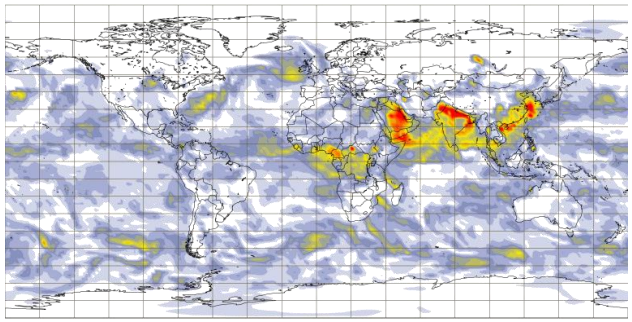
International Workshop

"Seamless Prediction of Air Pollution for Africa: from Regional to Urban"

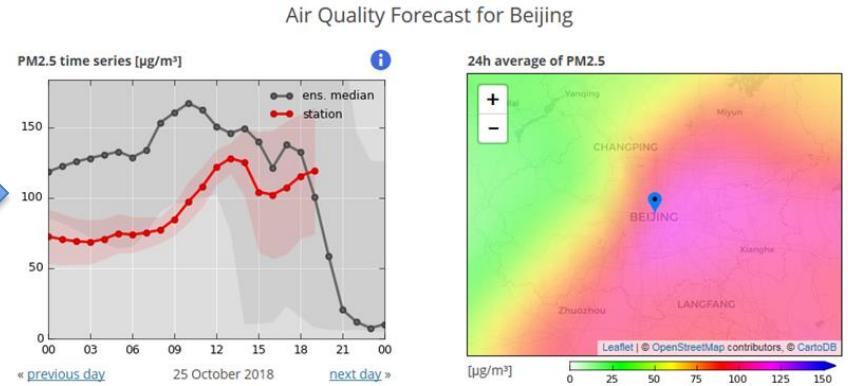
March 2018



A potential pilot project for future Global Data Processing and Forecasting System (GDPFS)



CAMS global forecast



MAP-AQ project forecast for China cities:
http://www.marcopolo-panda.eu/forecast/

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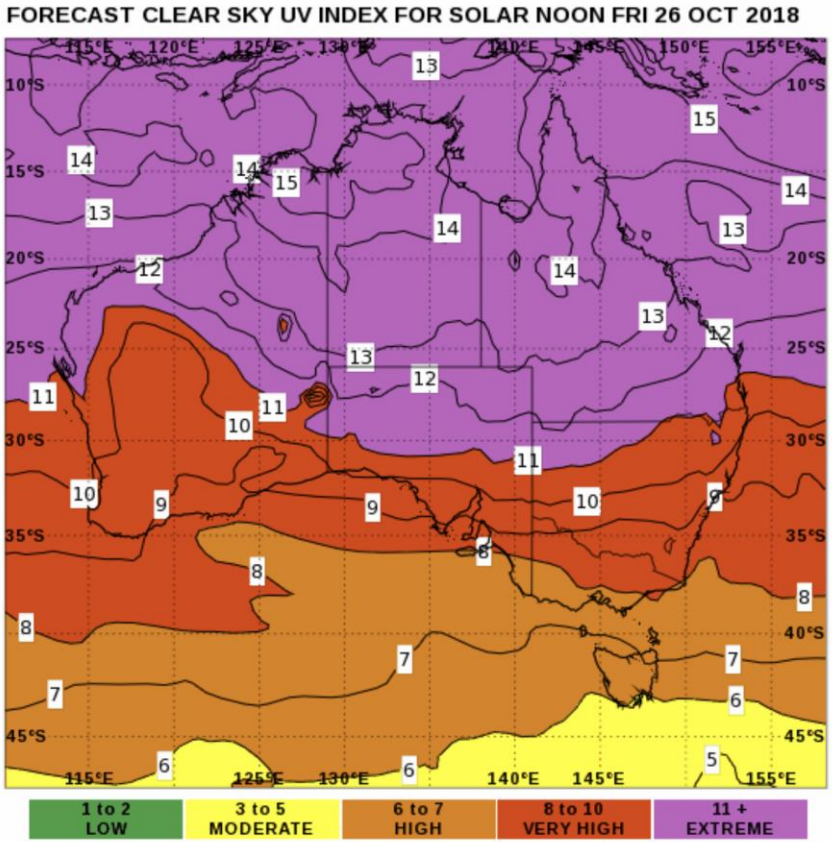
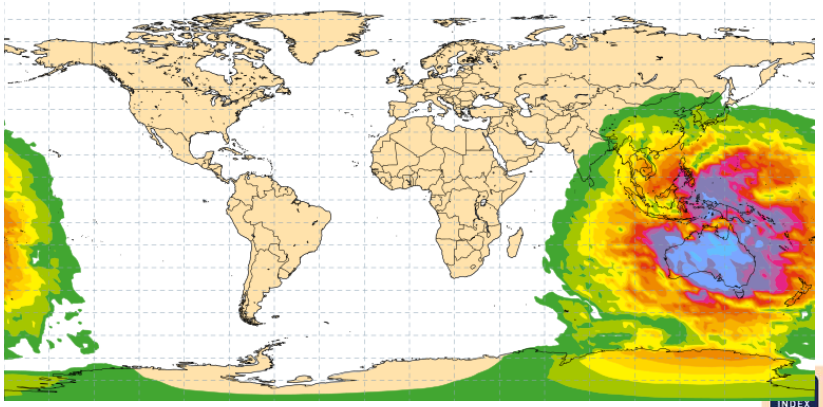
UV forecasts

Many National Hydro-Meteorological Services issue UV forecasts and warnings. Australia is a good example. The colour scale for the UV index goes to 11, which is considered “Extreme”. A large part of the world’s population experience a UV index of 11 or higher on a daily basis.

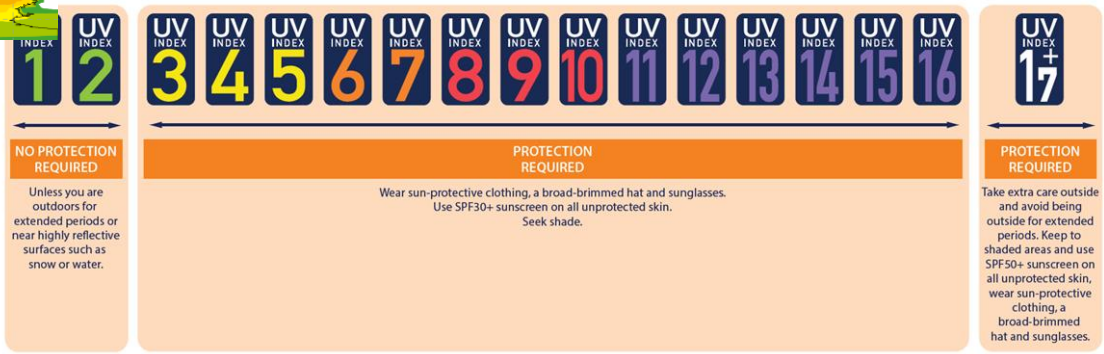
WHO and WMO have together proposed an extension of the UV Index colour scale.



UV forecast from BoM of Australia



CAMS also provides UV index forecasting



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Framework Convention on Climate Change (UNFCCC), New York, 1992, including the Kyoto Protocol, 1997, and the Paris Agreement, 2015

- WMO and its co-sponsored programmes (GCOS, WCRP, IPCC) provide scientific advice and regular reports to Parties at SBSTA and COP sessions on:
  1. Status of the climate system (6 global indicators)
  2. Concentration of GHGs in the atmosphere
  3. Implementation of Global Framework for Climate Services as a contribution to NAPs
  4. Special reports requested by Parties (e.g. IPCC 1.5C)

- WMO has a collaboration agreement with UNFCCC on a number of specific activities

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Memorandum of Understanding between WMO and UNFCCC

- Collaborative projects
  - Annual reporting on atmospheric GHG concentrations and the state of the global climate
  - Observation-based tools for improved national greenhouse gas emission estimates [IG^{3}IS]
  - Climate services for supporting adaptation planning and implementation
  - Regional collaboration for supporting adaptation and mitigation action

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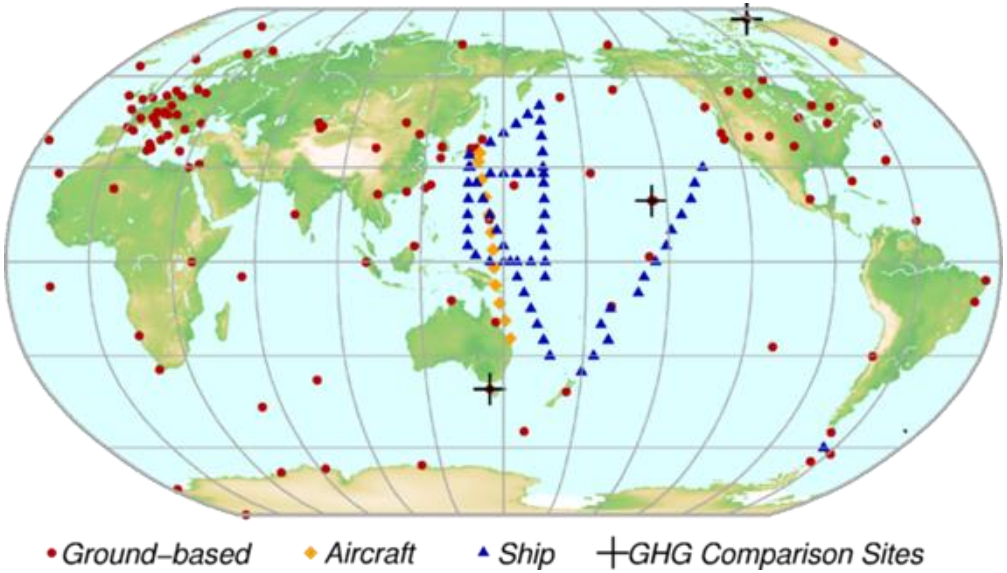
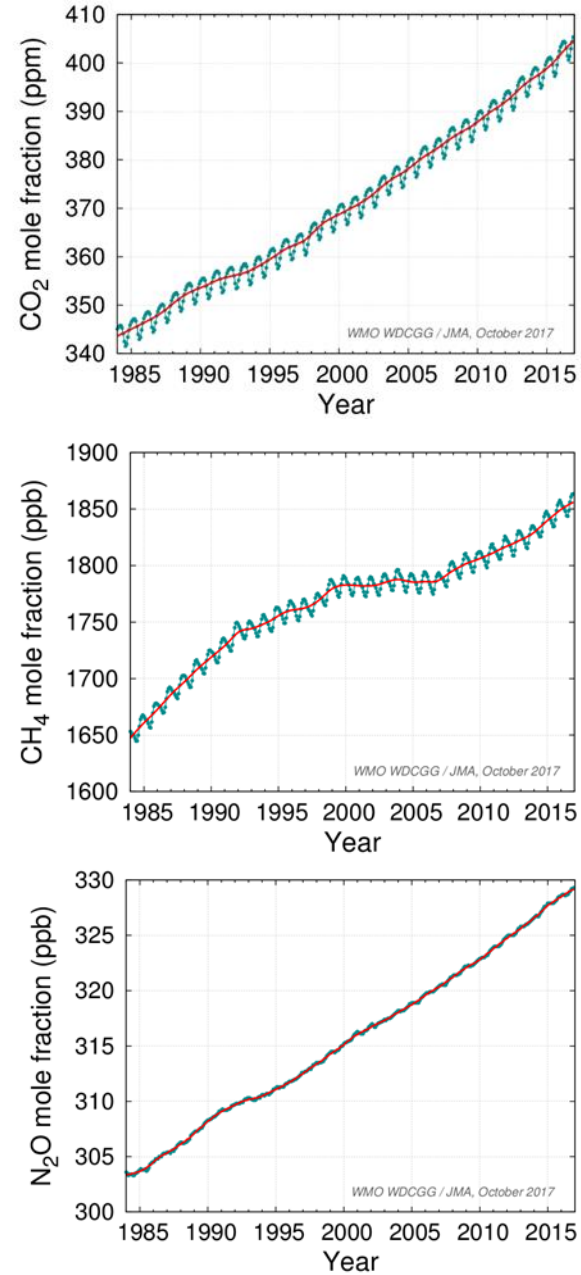
WMO Greenhouse Gas Bulletin



- Facilities establishment of the common standards, measurement methods and quality assurance for the GHG and other observations of atmospheric composition
- Leverage capabilities across programs and nations
- Build capacity in developing nations



Globally averaged mole fractions

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The Integrated Global Greenhouse Gas Information System (IG^{3}IS)

Goal: Support the success of post-COP21 actions of nations, sub-national governments, and the private sector to reduce climate-disrupting GHG emissions through a sound-scientific, **measurement-based approach** that:

- Improve knowledge of the national emissions, **WHAT?**
- identifies large and additional emission reduction opportunities, **WHERE?**
- provides nations with timely and quantified guidance on progress towards their emission reduction strategies and pledges (e.g., NDCs) **EFFECT?**

HOW? → IG^{3}IS Science Implementation Plan was approved by EC-70

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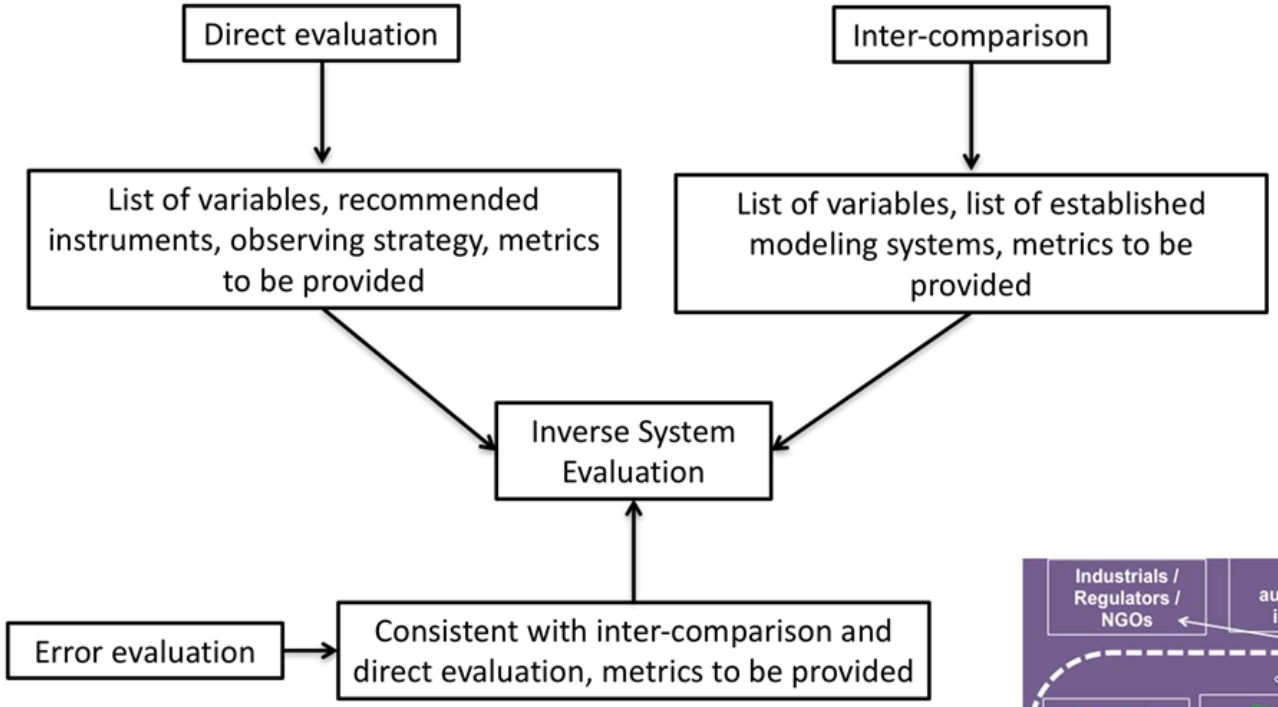
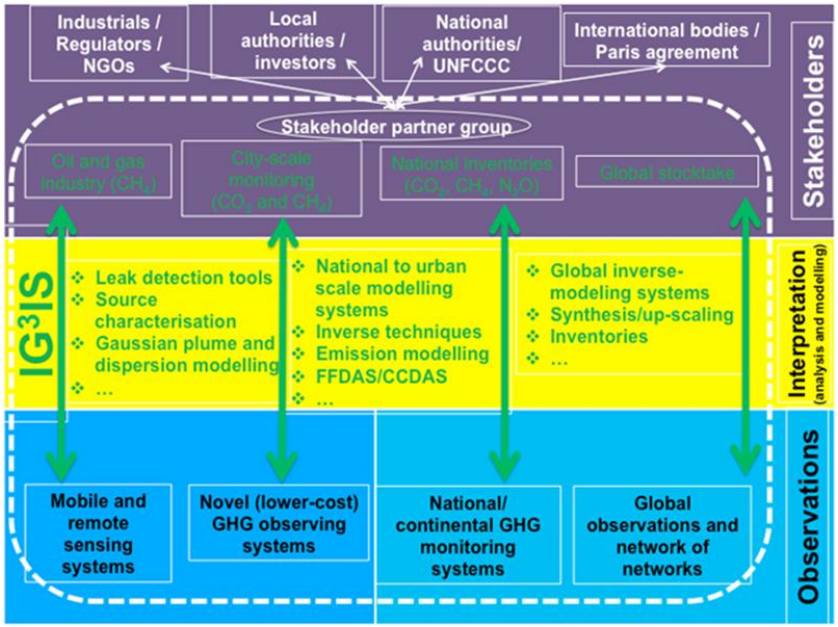
IG^{3}IS cross-cutting activity



CAMS will contribute into evaluation of inverse modelling systems



Goal is to establish benchmarks of inversion performance and the quality of derived emission estimates

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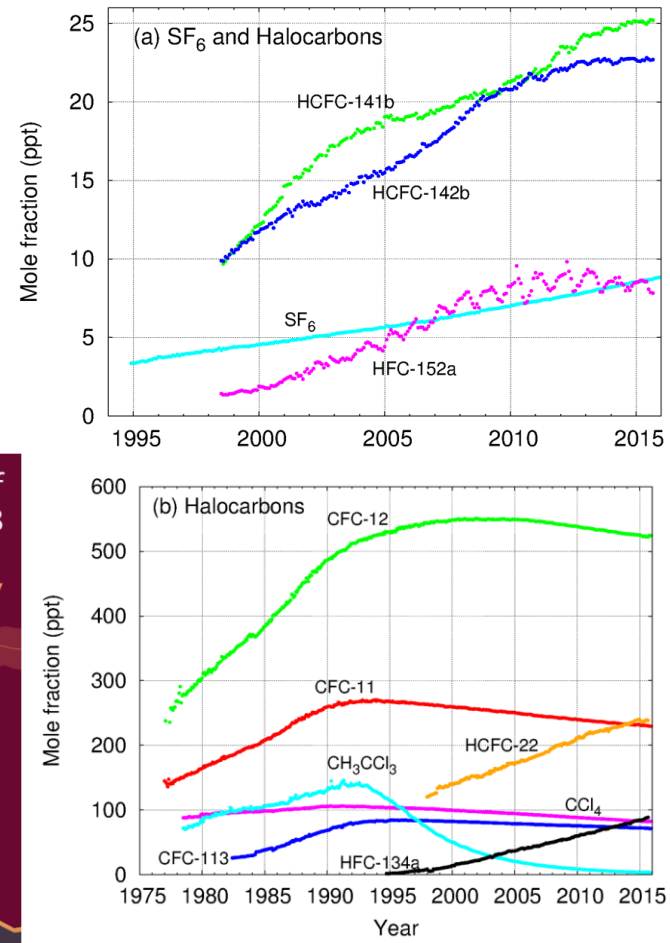
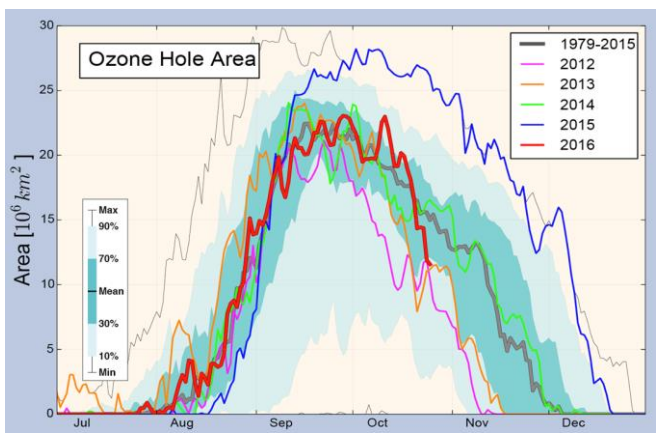
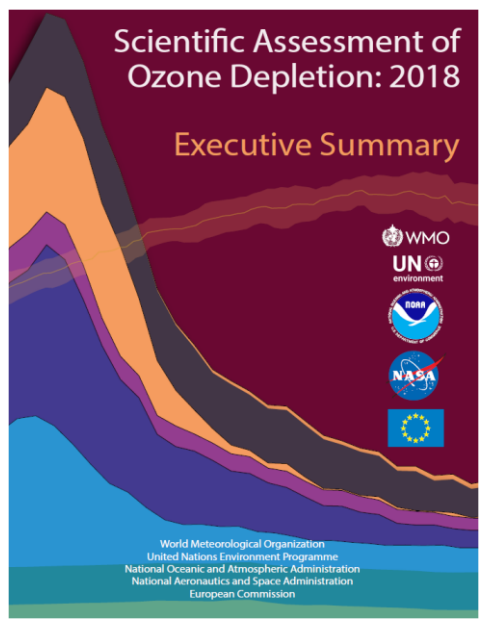
Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985, including the Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal 1987

- GAW coordinates observations and QA of ozone depleting gases. These observations allow to monitor the effect of the actions taken under the Montreal protocol (decline of CFCs, fig. (b))
- GAW coordinates observations and QA of total ozone (Brewer and Dobson networks) and vertical ozone profiles (ozone sondes) that allow to follow the recovery of the ozone hole



Monthly mean mole fractions of sulphur hexafluoride (SF_6) and the most important halocarbons. SF_6 and lower mole fractions of halocarbons (a) and higher ones of halocarbons (b).





CAMS contributes to the analysis of ozone hole

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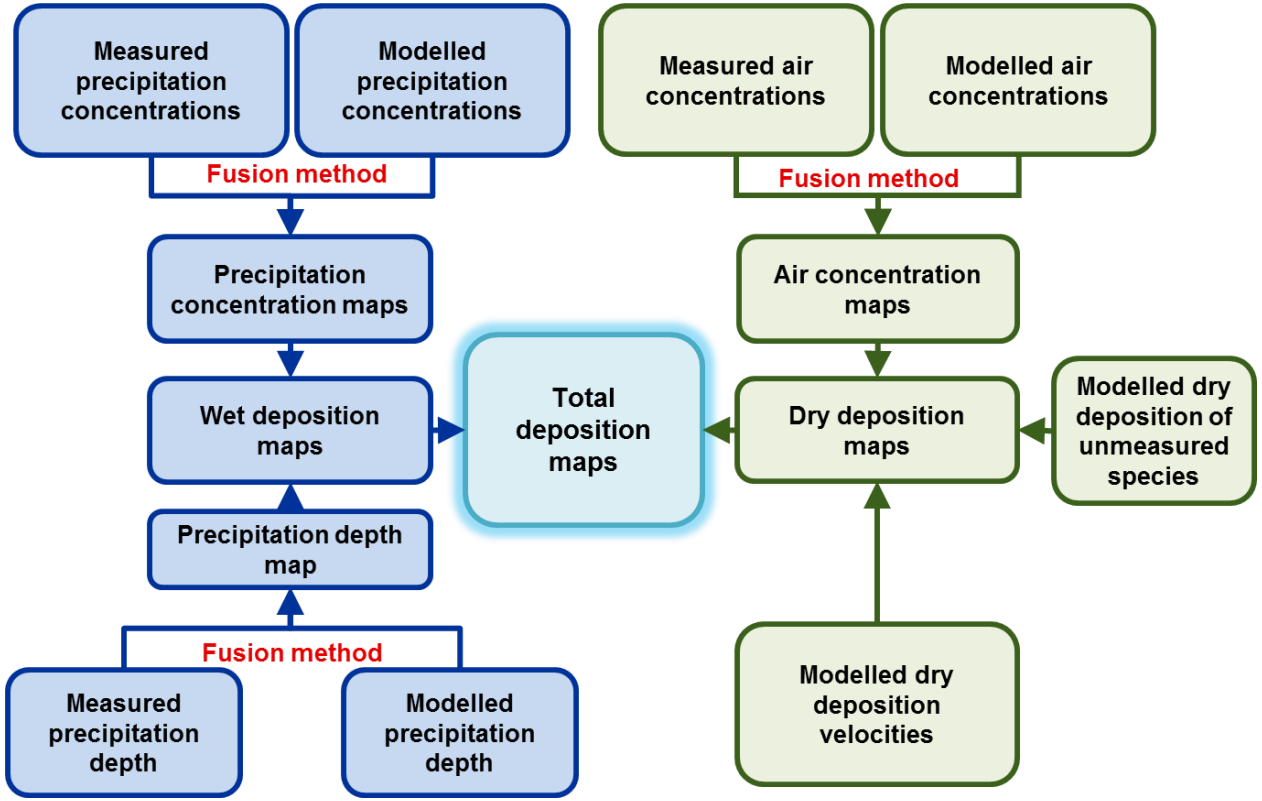
Convention on Biological Diversity (CBD), Nairobi, 1992

Goal 15: *Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.*

- GAW produced a global assessment of atmospheric deposition
- GAW initiated new project of the Measurement-Model Fusion for Total Atmospheric Deposition
- CAMS will be contributing to this project

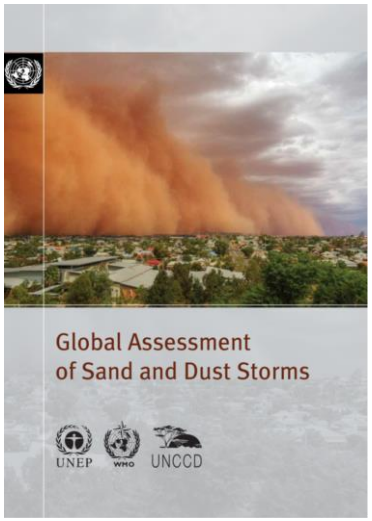


WMO OMM

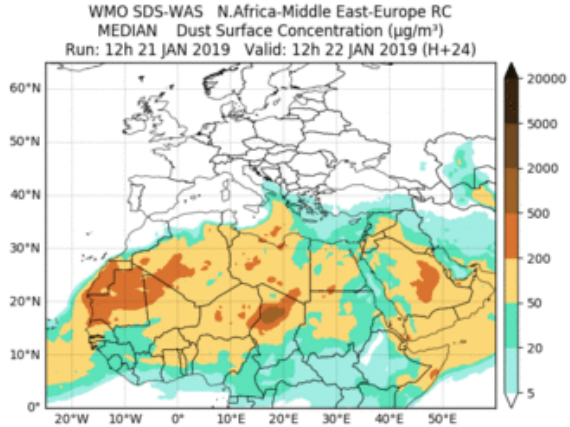
Convention to Combat Desertification (CCD), Paris, 1994

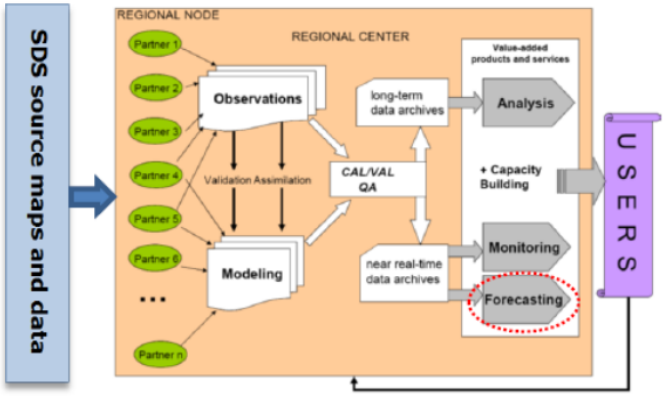
Goal 15: *Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.*

- GAW coordinates observations and QA of aerosols
- GAW partners produce forecasts of the sand and dust storms through the dedicated Sand-and-Dust Warning and Advisory System
- WMO contributed to the Global Assessment of the Sand and Dust storms



- **9 global models (including CAMS)**
- **11 regional models**
- **25 organizations**
- **3 regional nodes & centers (*NAMEE, Asia, Americas*)**
- **2 regional dust operational centers**





Impact on:
Health
Aviation
Agriculture
Economy
....

Warnings:
Public/Auth
Aviation
Agriculture
Goverment
....

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SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable.

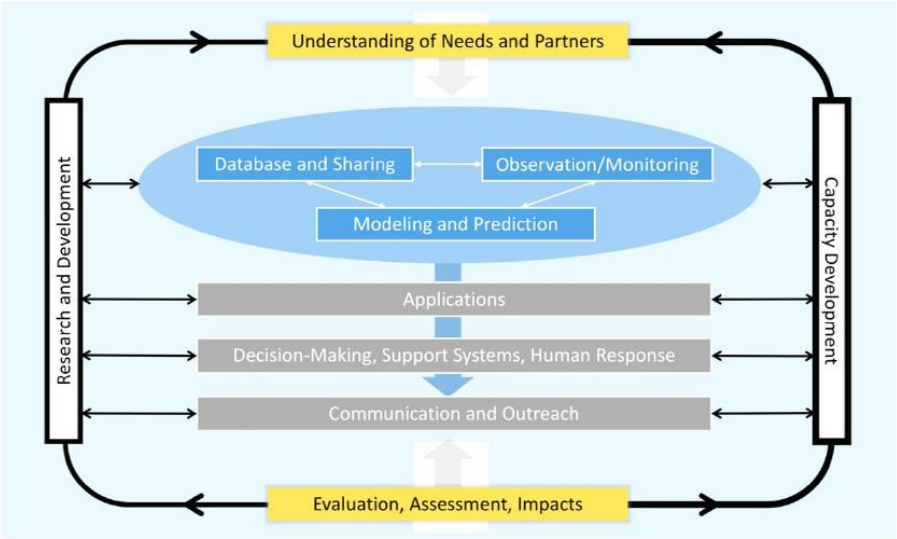
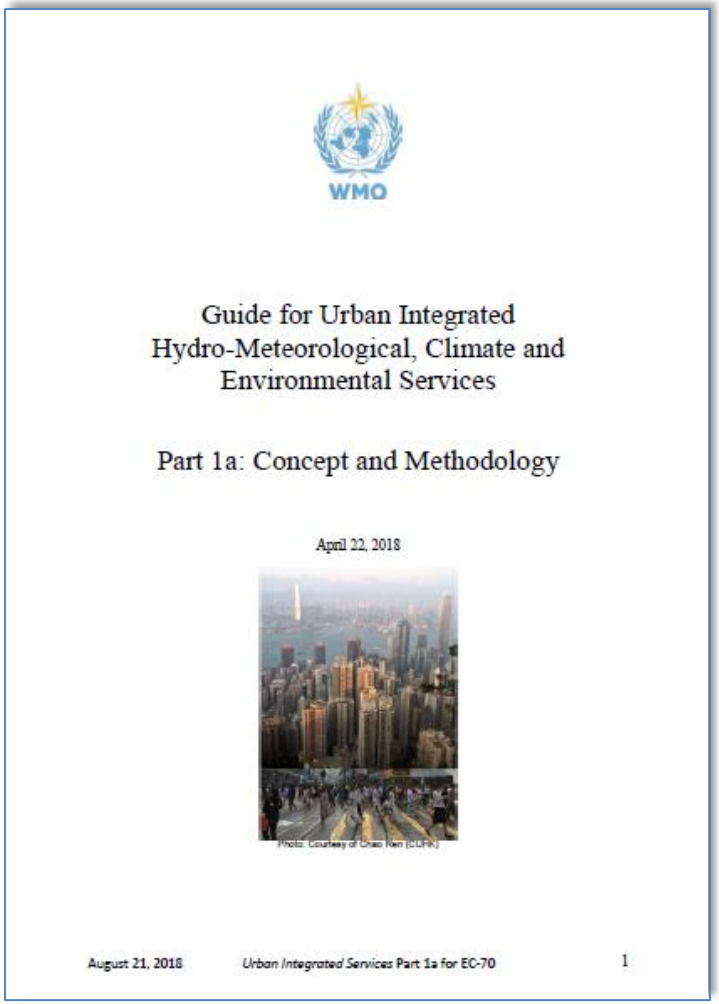


Figure 1: Schematic of the components of an Urban Integrated Service System

- Focus on impact-based forecast and risk-based warnings
- Addresses key scientific issues: requirements for observations; data assimilation; coupling of air quality, meteorological, surface, hydrological processes; seamless approach for scales interaction; high-resolution modelling



WMO

Guide for Urban Integrated Hydro-Meteorological, Climate and Environmental Services

Part 1a: Concept and Methodology

April 22, 2018

August 21, 2018 *Urban Integrated Services Part 1a for EC-70* 1

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Other relevant conventions

- Minamata Convention on Mercury, Minamata 2013 – WMO Executive Council took a Decision discouraging Member countries using mercury thermometers
- United Nations Convention on the Law of the Sea LOS Convention, Montego Bay, 1982 and SDG 14 “Conserve and sustainably use the oceans, seas and marine resources for sustainable development” – WMO is a co-sponsor of the GESAMP (Working groups 38 and 41) and an agency involved in UN-Oceans
- Comprehensive Test Ban Treaty 1996 – WMO runs 10 operational centers for Nuclear Preparedness

Thank you!
Merci!

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TEMPS CLIMAT EAU

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GLOBAL ATMOSPHERE WATCH